

# **VIDEO TELEPHONE INTEGRATING PUBLIC-SWITCH TELEPHONE NETWORK AND ASYMMETRIC DIGITAL SUBSCRIBER LINE**

## **BACKGROUND OF THE INVENTION**

### **5 (a) Field of the Invention**

The invention relates to a video telephone integrating public-switch telephone network (PSTN) and asymmetric digital subscriber line (ADSL), and more particularly, to a phone device capable of bi-directional video and audio transmissions using conventional  
10 telephone lines (double-twist lines). Not only PSTN, which serves as a telephone system for analog audio signals using copper wires, is utilized for providing audio transmissions as common telephones, but also a high frequency band ranging from 25 KHz to 1 MHz of ADSL is used for accomplishing video information transmissions. Through a connection  
15 established by the PSTN, Internet protocols and port addresses are transmitted in any form via the PSTN, including those of a receiving party to a calling part, and those of a calling party to a receiving party. Digital information is then transmitted via the Internet, thereby completing simultaneous and bi-directional video and audio transmissions between  
20 the receiving party and the calling party.

At the same time when using the Internet for transmissions, the PSTN may be disconnected or left connected.

Or, the PSTN may be employed for establishing an initial connection, and the Internet is then used for transmitting audio and video information  
5 between the receiving party and the calling party.

#### **(b) Description of the Prior Art**

Present analog public-switch telephone network (PSTN) plays a leading role in digital communications for being most complete in structure, and being most extensively used as well as inexpensive in  
10 price. In addition, the Internet that is rapidly advancing during the recent years, especially the world-wide-web (www), apart from offering conventional email transmissions, also realizes diverse multimedia services combining audio, graphics, and even dynamic video images. Thus, massive data are brought about along with these services. In  
15 order to acquire data accessing capabilities with higher transmission speeds, Internet service providers (ISP) have one after another proposed various schemes for increasing transmission speeds. As multimedia on the Internet gets more and more popular, it is only apparent that modems of 28.8, 33.6 or 56kbps using conventional  
20 dial-up telephone networks become inadequate for users to keep up with

the trend. Even, users of local networks and integrated system digital networks (ISDN) hardly consider speeds of their existing networks as satisfactory either.

Meanwhile, ~ digital subscriber line (xDSL) is gradually turning into a target attention of the public. Literally, DSL is a kind of digital subscriber line, with asymmetric digital subscriber line (ADSL) being one of the most prominent xDSL techniques. The ADSL utilizes the contemporary PSTN (or, plain old telephone service, POTS) to transmit data in high transmission speeds without requiring augmentation of existing fundamental structural equipments and techniques. Related standards of the ADSL have been established, and the ADSL is certainly to bring people with considerable benefits. Again, the word ADSL literally means asymmetric digital subscriber line; that is to say, a high frequency band ranging from 30 KHz to 1 MHz of common telephone lines (copper telephone lines in households), is not overlapped with a low frequency band occupied by telephone audio signals. Therefore, both audio signals and data can be simultaneously transmitted for increasing transmission speeds.

Because the ADSL utilizes present PSTN (POTS) lines for transmitting data with high transmission speeds, functions of conventional

telephones are essential. Within a bandwidth of 1 MHz, a lowest bandwidth of 4 KHz (0 to 4 KHz) is adopted for conventional telephone services. This bandwidth of 4 KHz is separated by a passive filter called a POST splitter from the bandwidth of 1 MHz, and is especially reserved and tailored for conventional telephone services. The rest portion as from 100 KHz to 1.1 MHz then transmits computer data at a speed of 6 bits per second. Moreover, because power supply that sends ADSL signals and POTS signals on a same line is provided by a telecommunication provider, power supply is still available even if when the ADSL line malfunctions or a personal computer is shut down. Therefore, a user may yet make phone calls using POTS channels by separating audio signals from ADSL signals. The ADSL separates conventional telephone services and computer data services to different channels, and hence it is ensured that telephone services function normally in cases of malfunctions or abruptions of ADSL services. To be more precise, telephones are able to function normally when multimedia transmissions are being performed via the ADSL.

Above all, owing to launches of various related products, communication bandwidths of the PSTN have been directly improved and user demands of PSTN have been indirectly lowered. Also,

popularity of newly promoted communication networks are to remain quite limited in the near future, and thus the PSTN still stands as the mainstream among data communication networks.

## **SUMMARY OF THE INVENTION**

5     The object of the invention is to provide a video telephone integrating public-switch telephone network (PSTN) and asymmetric digital subscriber line (ADSL) for bi-directional video and audio transmissions, in that the video telephone comprises a telephone and a control module unit of common PSTN system, an ADSL module unit, and an image  
10    access and display unit. The video telephone according to the invention is capable of bi-directional video and audio transmissions using conventional telephone lines (double-twist wires). Thus, while employing the PSTN for common telephone audio transmissions, video information is also transmitted using a high frequency band ranging from  
15    25 KHz to 1 MHz of the ADSL. Through a connection between two telephones and established by the PSTN, Internet protocols and port addresses are transmitted in any form via the PSTN, including those of a receiving party to a calling party, and those of a calling party to a receiving party. Digital information is then transmitted via the Internet,  
20    thereby completing simultaneous and bi-directional video and audio

transmissions between the receiving party and the calling party.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 shows a schematic view illustrating a fundamental structure of the video telephone according to the invention.

5      FIG. 2 shows a schematic view illustrating transmission status of audio and video transmissions of the video telephone according to the invention.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to FIG. 1 showing a structure of the video telephone  
10 integrating public-switch telephone network (PSTN) and asymmetrical digital subscriber line (ADSL) according to the invention, telephones operating with PSTN systems serve as a main structure. Each of telephones 10 and 11 has basic analog audio transmission lines, a handset 111 for receiving and sending audio, and a dialing assembly (not  
15 shown in the diagram). A complete video telephone 1 comprises the telephone 10 operating with PSTN systems, a control module unit 12 connected with communication lines of the telephone 10, so as to enable audio transmissions of the PSTN telephone.

A complete video telephone 2 comprises the telephone 11 operating  
20 with PSTN systems; a control module unit 12 connected with

communication lines of the telephone 10, so as to enable audio transmissions of the PSTN telephone; an Internet protocol A 15 for dialing up an ADSL module unit 13 at activation of the telephone; an ADSL module unit 13, which is connected with the PSTN network to obtain an Internet protocol B 16, and to dial-up to the Internet using PSTN lines after receiving an activation signal of the control module unit 12, so as to develop digital data transmissions between a receiving party and a calling party; and an image access and display unit 14 connected with the ADSL module unit 13, and having an image sensor 141 and a display device 142, wherein the image sensor 141 and the display device 142 are preferably capable of direct digital image signal transmissions, such that digital image signals are acquired by the image sensor 141, transmitted to the receiving party and the calling party at the other terminal via the ADSL module unit 13, and image signals sent from the receiving party and the calling party at the other terminal are displayed by the display device 142.

Apart from constructing a dial-up structure, the ADSL module unit 13 also combines 4 KHz POTS signals with xDSL signals, which are together transmitted to a user end via existing PSTN lines. A filter then separates the POTS signals from the digital signals, and the digital

signals are modulated or decoded. The image sensor 141 of the access and display unit 14 may be a charge coupled device (CCD) element that directly accesses digital image signals, or certainly, may be a less costly complementary metal oxide semiconductor (CMOS) digital  
5 image sensor. Thus, digital image signals are accessed and transmitted using the ADSL module unit 13. The display device 142 may be a liquid crystal display (LCD), or other display devices that directly display digital image signals received.

From above, the video telephone 1 according to the invention is  
10 directly connected with PSTN lines. Under circumstances that the receiving party and the calling party are simultaneously using the video telephone 1, when a receiving party user dials telephone number of the receiving party using the handset 111 of the video telephone 1, the control module unit 12 is activated to send a signal. The signal  
15 commands the ADSL module unit 13 to dial-up to the Internet, and an Internet protocol A 15 is obtained. At an instant that the control module unit 12 of the video telephone 1 of the calling party receives ringing signals of the calling party and becomes activated after the user picks up the handset 111, another signal is sent to command the ADSL module  
20 unit 13 to dial-up to the Internet and to further obtain another Internet



protocol B 16. Via the PSTN lines, the Internet protocol A 15 or B 16 is sent to the control module unit 12 of the receiving party or the calling party. For both the receiving party and the calling party, linkage is performed via the Internet using the Internet protocols send by the PSTN, and video data are bi-directionally transmitted and received between the calling party and the receiving party. Hence, common telephone audio transmission functions are accomplished by the PSTN, and at the same time, bi-directional video signal transmissions are also achieved between the receiving party and the calling party by transmitting video data using the high frequency band of the ADSL.

Referring to FIG. 2, common telephone audio transmission functions are accomplished by the PSTN. In addition, video signal transmissions are also achieved using the high frequency band ranging from 25 KHz to 1 MHz of the ADSL. Through a connection established by the PSTN, Internet protocols and port addresses are transmitted in any form via the PSTN, including those of the receiving party to the calling part, and those of the calling party to the receiving party. Digital information is then transmitted via the Internet, thereby completing simultaneous and bi-directional video and audio transmissions between the receiving party and the calling party.

According to the aforesaid structure, simultaneous and bi-directional video and audio transmissions between the receiving party and the calling party are achieved. More particularly, the bi-directional video transmissions are completed merely by conventional dial telephones  
5 without requiring any changes in users' original dialing habits, and hence making operational conveniences of the invention even more outstanding.

The video telephone integrating PSTN and ADSL according to the invention, by integrating a common telephone and a control module unit  
10 of PSTN systems, an ADSL module unit, and an image access and display unit, provides a video telephone capable of bi-directional video and audio transmissions using conventional telephone lines (double-twist wires). Thus, while employing the PSTN for common telephone audio transmissions, video information is also transmitted  
15 using a high band ranging from 25 KHz to 1 MHz of the ADSL. Through a connection established by the PSTN, Internet protocols and port addresses are transmitted in any form via the PSTN, including those of the receiving party to the calling part, and those of the calling party to the receiving party. Digital information is then transmitted via the Internet,  
20 thereby completing simultaneous and bi-directional video and audio

transmissions between the receiving party and the calling party.

It is of course to be understood that the embodiment described herein is merely illustrative of the principles of the invention and that a wide variety of modifications thereto may be effected by persons skilled in the art without departing from the spirit and scope of the invention as set  
5 forth in the following claims.